Electronic Version
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Claims

[c1] 1.A method for compensating for communications channel delay asymmetry in a current differential protection system, the method comprising:
determining an apparent sampling clock offset for a communications channel, said apparent sampling clock offset between a first sampling clock and a second sampling clock configured within the current differential protection system;
determining an apparent global positioning system (GPS) clock offset for said communications channel, said GPS clock offset between a plurality of GPS time stamps corresponding to said first and said second sampling clocks; and
determining a compensated clock offset by subtracting said apparent GPS clock offset from said apparent sampling clock offset so as to cancel out a channel asymmetry component of deviation in said apparent GPS and sampling clock offsets.

[c2] 2.The method of claim 1, wherein said cancelled channel asymmetry component of deviation represents half of the actual channel asymmetry.

[c3] 3.The method of claim 1, further comprising:
inputting said compensated clock offset into a phase locked loop;
wherein an output of said phase locked loop is used to synchronize said first and second sampling clocks.

[c4] 4.The method of claim 3, wherein said phase locked loop further comprises a frequency-phase locked loop.

[c5] 5.The method of claim 3, wherein said sampling clock offset and said GPS clock offset are determined using a ping-pong algorithm.

[c6] 6.The method of claim 5, further comprising converting said apparent GPS clock offset to a power system frequency associated with said first and second sampling clocks.

[c7] 7.A system for compensating for communications channel delay asymmetry in a current differential protection system, comprising:
a first algorithm for determining an apparent sampling clock offset for a communications channel, said apparent sampling clock offset between a first sampling clock and a second sampling clock configured within the current differential protection system;
a second algorithm for determining an apparent global

positioning system (GPS) clock offset for said communications channel, said apparent GPS clock offset between a plurality of GPS time stamps corresponding to said first and said second sampling clocks; and

a mechanism for computing a compensated clock offset by subtracting said apparent GPS clock offset from said apparent sampling clock offset so as to cancel out a channel asymmetry component of deviation in said apparent GPS and sampling clock offsets.

[c8] 8.The system of claim 7, wherein said cancelled channel asymmetry component of deviation represents half of the actual channel asymmetry.

[c9] 9.The system of claim 7, further comprising:

a phase locked loop having said compensated clock offset as an input thereto;

wherein an output of said phase locked loop is used to synchronize said first and second sampling clocks.

[c10] 10.The system of claim 9, wherein said phase locked loop further comprises a frequency-phase locked loop.

[c11] 11.The system of claim 9, wherein said first and second algorithms further comprise a ping-pong algorithm.

[c12] 12.The system of claim 11, wherein said apparent GPS clock offset is converted to a power system frequency

associated with said first and second sampling clocks.